Wall Stove Keeps Heat In, Ash Out

Wood heat is nice, but the mess that it makes inside the house can result in "domestic disturbance". Dan Yoder built a stove that takes care of the problem. His modified 275-gal. fuel tank loads from the outside but extends inside to heat the house and hot water.

"I cut a hole in the wall to fit the stove and put it inside an entry room," explains Yoder. "It takes logs up to 4 1/2 ft. long."

A 4 by 8-ft. steel plate is screwed to the wall of the house and bolted to the end of the stove, leaving a gap of about 10 in. between them. Holes cut in the plate match the holes in the tank end.

Yoder fabricated steel necks between the stove and the plate so airtight doors could be hung on the steel plate for both loading wood into the stove and removing ash. Rock wool between the stove and the steel plate insulate the plate from the heat. Even with the insulation and the 10-in. necks, Yoder was concerned about the doors warping. He reinforced the doors with a strap of iron on edge on the inside of the door. A fiberglass gasket around the door keeps it airtight.

"The fuel tank has warped a little from the heat, but it doesn't have to be fired that hot, given its size," explains Yoder. "I plan to line the bottom and 1/3 of the sides with refractory cement or bricks."

To further moderate the heat from the stove and hold it through the night, Yoder has fabricated saddles of hog panels lined with 1/4-in. sq. hardware cloth. They hold fieldstones in place over the top of the stove.

"With the stones, it doesn't get real hot by the stove anymore and the heat stays more even throughout the house," says Yoder.

The primary source of hot water for the house is a propane-fired water heater. However, when the stove is going, the propane isn't needed. Yoder runs a water line through the stove and into a pressure tank mounted on the wall above the stove. Hot water from the tank cycles through the water heater.

Modified 275-gal. fuel tank loads from outside to heat Yoder's house and hot water.

A separate water line runs from the pressure tank to a 30-gal. tank in the living room. A return line circulates water back to the tank. No pump is involved, simply convective heat moving through the pipes.

"The tank in the living room brings in enough heat that it stays fairly cozy in the morning," says Yoder. "The stove works great. Between the rocks and the water line, it heats a 1,400 sq. ft. house with no fans. We just open and close doors and vents in the house for the air to circulate."

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Gas Water Heaters Heated With Wood

Dan Yoder uses three old LP-fired water heaters to supply hot water - but he doesn't use any propane. They're fired with wood.

The water heaters sit on top of a 275-gal. fuel tank he lay on its side and modified for use as a stove. A piece of 1/4-in. steel welded to the top has three holes in it large enough to seat the ends of the water heater tanks.

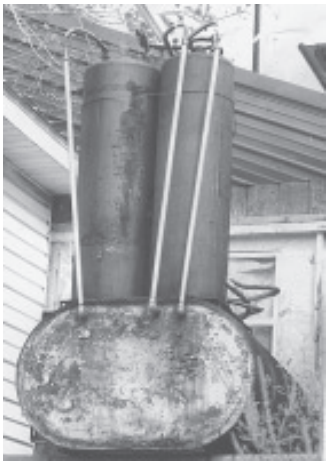
"Gas-fired hot water heaters are perfect for this because they have a pipe running up through their centers for the gas-fired heat," says Yoder. "Those 3-in. pipes serve as chimneys for the stove."

Water in the tanks is heated through direct contact with the stove and waste heat captured as the smoke exits.

Yoder utilizes a combination of water pressure and convection to keep water moving through the tanks. A cold water line is divided three ways to enter each water tank near the bottom. Hot water lines come off the top of the three tanks and are teed into a line that goes to the house. At the house, hot water can run through an auxiliary propane-fired water heater to house water taps or direct to the shower.

"There is enough hot water in the three tanks for eight people to shower," says Yoder. "The volume also is enough that the hot water tanks have never overheated. I have a pressure relief valve on the line, but it has never popped."

When hot water isn't being used, it recirculates through the tanks via convection. Yoder runs a water line from the top of each tank at an angle down and to the front of the stove. The lines run through the stove and return to reenter near the bottom of each tank. He stresses there can be no dip or bend in the pipes that allow air to be trapped or the convection system won't work.



Three formerly LP-fired water heaters sit on top of a 275-gal. fuel tank laid on its side, and modified for use as a stove.

With all the water volume, we never have to fire the stove that much," says Yoder. "We can cut off the air and leave it smoldering for up to two days before it will go out. When we want hotter water, we just open the draft a little, and it heats up fast."

Yoder says the entire apparatus cost him no more than $400 to set up. It would have been less, but he used copper flex pipe for the water joints. "It saves a lot of time spent cutting pipe, and it helps reduce the chance of an air lock," says Yoder.

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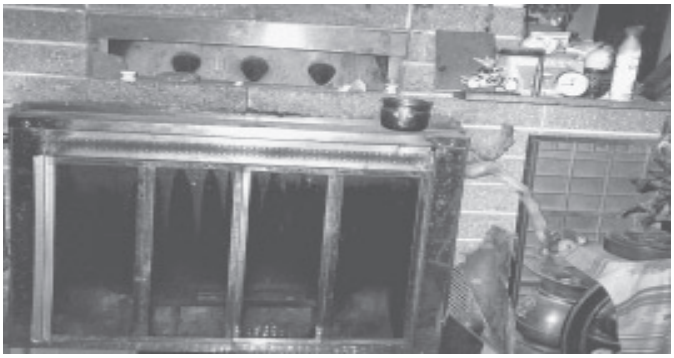

Heatilator blows heat into Ted Boice's living area, keeping his house warm long after the fire has gone out.

Water Tank Stores Fireplace Heat

Ted Boice's fireplace keeps his house warm long after the fire has gone out, thanks to a 140-gal. hot water storage tank. A heatilator blows heat into the living area, while a heat exchanger transfers heat to a tank. There the heat is stored until needed to warm his 1,060 sq. ft. home.

"I haven't bought propane to heat my house for 15 years or more," says the retired Montanan. Wood use is minimal too, running only half a cord of wood a month.

Boice's cement block home is designed for energy efficiency with the rear side built into 6 to 7 ft. of dirt, heavily insulated walls, and high-grade windows.

Boice's heat exchange coil is made out of 1-in. stainless steel pipes that feed steam to brass pipes and then copper. He uses lengths of rubber heater hoses periodically in the system to cut down on electrolysis between the steel and copper and to give some "slack" in the system. He acknowledges that if he used antifreeze in a closed system, he wouldn't have needed stainless steel.

The coil itself is a "ladder" of 14 1-in. pipes that lay beneath the burning wood. When water in the coil reaches 160 degrees, cooler water is pumped through it to the water tank in a utility room at the back of the house. With entrance and exit points well below the surface of the water, air in the pipes is not a concern.

"The water temperature in the tank stratifies," says Boice. "The top can be so hot that I can't keep my hand in it while the bottom will be 80 degrees. After heating a while, it will be hot all the way to the bottom, and then I'll shut down the fireplace."

He usually heats the water in two 4-hour spans to 140 degrees or more. The open top tank prevents pressure from building in the pipes. At the same time, it serves as a constant source of passive heat release to the house. When the temperature in the living area drops, such as overnight, a fan kicks in, moving warm air from the utility room throughout the house.

Heat exchange coil is made out of 1-in. stainless steel pipes in the firebox that pull heat out of the fire.

Pump pulls water from heat exchanger to storage tank.

"The surface of the water tank never gets below 80 degrees during the winter," says Boice. He also designed the heatilator system in his fireplace. Fans switch on when air in the tubes at the back of the fire reach 90 degrees. As the fire burns down and the temperature in the tubes drops below 90 degrees, the fans shut down.

"It's not rocket science," he says. "You can build a heatilator into almost anything and capture heat that would just go up the chimney."

Boice's system was built at practically no cost, with a friend doing the welding and providing the steel in exchange for use of a trailer. Even the thermostat for the heatilator was salvaged from a furnace.

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Some of the best new ideas we hear about are "made it myself" inventions born in farmers' workshops. If you've got a new idea or favorite gadget you're proud of, we'd like to hear about it. Send along a photo or two, and a description of what it is and how it works. Is it being manufactured commercially? If so where can interested farmers buy it? Are you looking for manufacturers, dealers or distributors? Send to FARM SHOW, P.O. Box 1029, Lakeville, Minn. 55044 or call toll-free 800 834-9665. Or you can submit an idea at our website at www.farmshow.com.

Mark Newhall, Editor

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